

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) A defect inspection apparatus for inspecting a pattern on an object, comprising:

an image pickup device for performing an image pickup of an object to acquire data of an inspection image which is multitone;

a memory for storing data of a reference image; and

an operation part for performing the steps of:

setting a specified pixel value range which is positioned between representative pixel values of two regions in said inspection images and/or said reference image, said two regions corresponding to two kinds of regions on said object;

obtaining transfer characteristics to enhance a difference between arbitrary pixel values included in said specified pixel value range among a plurality of specified pixel values which are specified in defect detection relatively to relative to a difference between arbitrary pixel values other than said specified pixel value range;

obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics; [[to,]] and

[[perform]] performing an inspection on the basis of said enhanced differential image.

2. (Original) The defect inspection apparatus according to claim 1, wherein
said operation part converts said inspection image and said reference image on the basis
of said transfer characteristics to obtain a differential image between a converted inspection
image and a converted reference image as said enhanced differential image.

Claims 3-4. (Cancelled)

5. (Currently Amended) The defect inspection apparatus according to claim 1 [[4]],
wherein
each of said representative pixel values ~~are~~ is an average values value of values of pixels
belonging to said two regions, respectively ~~a region~~.

6. (Currently Amended) ~~The~~ A defect inspection apparatus ~~according to claim 3,~~
~~wherein~~ for inspecting a pattern on an object comprising:
an image pickup device for performing an image pickup of an object to acquire data of an
inspection image which is multitone
a memory for storing data of a reference image; and
an operation part for performing the steps of:
setting a specified pixel value range which is ~~said plurality of specified pixel~~
~~values are~~ positioned outside a pixel value range corresponding to a specific region in said
inspection image and/or said reference image, said specific region corresponding to a specific
kind of region on said object;

obtaining transfer characteristics to enhance a difference between arbitrary pixel values included in said specified pixel value range relative to a difference between arbitrary pixel values other than said specified pixel value range;

obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics and

performing an inspection on the basis of said enhanced differential image.

7. (Original) The defect inspection apparatus according to claim 6, wherein said pixel value range corresponding to said specific region is set on the basis of a standard deviation of values of pixels belonging to said specific region.

Claims 8-9. (Cancelled)

10. (Original) The defect inspection apparatus according to claim 1, wherein said transfer characteristics include inspection image transfer characteristics obtained from said inspection image and reference image transfer characteristics obtained from said reference image.

11. (Original) The defect inspection apparatus according to claim 1, wherein said operation part synthesizes a differential image between said inspection image and said reference image and said enhanced differential image and compares values of pixels in a synthesized image with a predetermined threshold value, to perform inspection.

12. (Original) The defect inspection apparatus according to claim 1, wherein each of a plurality of images which are obtained by dividing an image acquired by said image pickup part is said inspection image.

13. (Currently Amended) A defect inspection method for inspecting pattern on an object, comprising the steps of:

- a) preparing data of a reference image;
- b) performing an image pickup of an object to acquire data of an inspection image

which is multitone;

c) setting a specified pixel value range which is positioned between representative pixel values of two regions in said inspection image and/or said reference image, said two regions corresponding to two kinds of regions on said object;

[[c]] d) obtaining transfer characteristics to enhance difference between arbitrary pixel values included in said specified pixel value range among a plurality of specified pixel values which are specified in defect detection relatively to difference between arbitrary pixel values other than said specified pixel value range said, plurality of specified pixel values;

[[d]] e) obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics; and

[[e]] f) performing inspection on the basis of said enhanced differential image.

14. (Currently Amended) The defect inspection method according to claim 13, wherein said inspection image and said reference image are converted on the basis of said transfer characteristics to obtain a differential image between a converted inspection image and a converted reference image as said enhanced differential image in said step ~~[[d]]~~ e).

Claims 15-16. (Cancelled)

17. (Currently Amended) The defect inspection method according to claim 13 ~~[[16]]~~, wherein
each of said representative pixel values are ~~is an average~~ values ~~value~~ of values of pixels belonging to ~~[[a]]~~ said two regions, respectively.

18. (Currently Amended) ~~The~~ A defect inspection method ~~according to claim 15,~~
~~wherein for inspecting a pattern on an object, comprising the steps of:~~
a) preparing data of a reference image
b) performing an image pickup of an object to acquire data of an inspection image
which is multitone;
c) setting a specified pixel value range which is ~~said plurality of specified pixel~~
~~values are~~ positioned outside a pixel value range corresponding to a specific region in said inspection image and/or said reference image, said specific region corresponding to a specific
kind of region on said object;

d) obtaining transfer characteristics to enhance a difference between arbitrary pixel values included in said specified pixel value range relative to a difference between arbitrary pixel values other than said specified pixel value range;

e) obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics; and

f) performing inspection on the basis of said enhanced differential image.

19. (Original) The defect inspection method according to claim 18, wherein said pixel value range corresponding to said specific region is set on the basis of a standard deviation of values of pixels belonging to said specific region.

20. (Cancelled)

21. (Original) The defect inspection method according to claim 13, wherein said transfer characteristics include inspection image transfer characteristics obtained from said inspection image and reference image transfer characteristics obtained from said reference image.

22. (Currently Amended) The defect inspection method according to claim 13, wherein said step f [[e)]] comprises the steps of:
synthesizing a differential image between said inspection image and said reference image and said enhanced differential image; and
comparing values of pixels in a synthesized image with a predetermined threshold value.

23. (Cancelled)

24. (Currently Amended) A computer-readable recording medium carrying a program for executing inspection of pattern, wherein execution of said program by a computer causes said computer to perform the steps of:

- a) preparing data of a reference image;
- b) preparing data of an inspection image which is multitone;
- c) setting a specified pixel value range which is positioned between representative pixel values of two regions in said inspection image and/or said reference image, said two regions corresponding to two kinds of regions on said object;
- d) [[c)]] obtaining transfer characteristics to enhance a difference between arbitrary pixel values included in said specified pixel value range ~~among a plurality of specified pixel values which are specified in defect detection relatively to~~ relative to a difference between arbitrary pixel values other than said specified pixel value range ~~said plurality of specified pixel values;~~
- e) [[d)]] obtaining an enhanced differential image between said inspection image and said reference image on the basis of said transfer characteristics; and
- f) [[e)]] performing inspection on the basis of said enhanced differential image.

25. (New) The defect inspection apparatus according to claim 1, wherein
said transfer characteristics are obtained in the form of two-dimensional lookup table, and
said enhanced differential image is obtained by using said two-dimensional lookup table.

26. (New) The defect inspection apparatus according to claim 6 wherein said transfer characteristics include inspection image transfer characteristics from said inspection image and reference image transfer characteristics obtained from said reference image.

27. (New) The defect inspection apparatus according to claim 6 wherein said operation part synthesizes a differential image between said inspection image and said reference image and said enhanced differential image and compares values of pixels in a synthesized image with a predetermined threshold value, to perform inspection.

28. (New) The defect inspection apparatus according to claim 6 wherein each of a plurality of images which are obtained by dividing an image acquired by said image pickup part is said inspection image.

29. (New) The defect inspection apparatus according to claim 6 wherein said transfer characteristics are obtained in the form of a two-dimensional lookup table, and said enhanced differential image is obtained by using said two-dimensional lookup table.

30. (New) The defect inspection method according to claim 13 wherein said transfer characteristics are obtained in the form of a two-dimensional lookup table and said enhanced differential image is obtained by using said two-dimensional lookup table.

31. (New) The defect inspection method according to claim 18 wherein
said transfer characteristics include inspection image transfer characteristics obtained
from said inspection image and reference image transfer characteristics obtained from said
reference image.

32. (New) The defect inspection method according to claim 18 wherein
said step f) comprises the steps of:
synthesizing a differential image between said inspection image and said reference image
and said reference image and enhanced differential image; and
comparing values of pixels in a synthesized image with a predetermined threshold value.

33. (New) The defect inspection method according to claim. 18 wherein
said transfer characteristics are obtained in the form of a two-dimensional lookup table
and said enhanced differential image is obtained by using said two-dimensional lookup table.